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=> d his

     (FILE 'HOME' ENTERED AT 13:11:03 ON 24 AUG 2006)
     FILE 'CA' ENTERED AT 13:11:10 ON 24 AUG 2006
L1   108 S (INVIVO OR VIVO) AND DIELECTRIC?
L2     4 S L1 AND(CANCER? OR TUMOR? OR MALIGN? OR HARMON?)
L3    22 S ((MULTI OR MULTIPLE OR PLURAL?)(2A)FREQUENCY OR MULTIFREQUENCY)(4A)
         (RESONA? OR OSCILLAT? OR TRANSDUCER) AND(RADIOFREQUENCY OR HARMON?)
L4    26 S L2-3
L5    16 S L4 AND PY<2000
     FILE 'BIOSIS' ENTERED AT 13:14:28 ON 24 AUG 2006
L6    10 S L5
     FILE 'MEDLINE' ENTERED AT 13:14:42 ON 24 AUG 2006
L7     7 S L5
     FILE 'CA, BIOSIS, MEDLINE' ENTERED AT 13:15:20 ON 24 AUG 2006
L8    38 DUP REM L4 L6 L7 (5 DUPLICATES REMOVED)

=> d bib,ab l8 1-38

L8    ANSWER 29 OF 38  BIOSIS on STN
AN    1987:67553  BIOSIS
TI    A NEW DESIGN OF MICROWAVE INTERSTITIAL APPLICATIONS FOR HYPERTHERMIA
      WITH IMPROVED TREATMENT VOLUME.
AU    LEE D-J [Reprint author]; O'NEILL M J; LAM K-S; ROSTOCK R; LAM W-C
CS    600 N WOLFE ST, DEP OF RADIATION ONCOL, THE JOHNS HOPKINS HOSP,
      BALTIMORE, MD 21205, USA
SO    International Journal of Radiation Oncology, Biology, Physics, (1986)
      Vol. 12, No. 11, pp. 2003-2008.
AB    New 915 MHz microwave interstitial applicators with improved treatment
      volume have been developed for clinical hyperthermia.  The applicators
      are made from semi-rigid miniature coaxial cables by removing sections
      of the outer copper conductor to create multiple nodes while preserving
      the integrity of the teflon dielectric insulators.  The homogeneity of
      the temperature distribution along the longitudinal axis is optimized by
      empirically adjusting the spacing of the gaps between sections of the
      outer conductor along the length of the applicator.  In vitro and in
      vivo testing of the two-node and three-node microwave applicators show
      that the treatment volume can be improved by 100% over that of a one-
      node microwave applicator.

=> log y
STN INTERNATIONAL LOGOFF AT 13:15:47 ON 24 AUG 2006

=> d his

     (FILE 'HOME' ENTERED AT 11:32:04 ON 24 AUG 2006)
     FILE 'CA' ENTERED AT 11:32:11 ON 24 AUG 2006
L1   108 S (INVIVO OR VIVO) AND DIELECTRIC?
L2    18 S L1 AND FREQUENCY
L3     0 S HYBRID STATE MASER
L4     7 S HYBRID (3A) MASER
L5   295 S ((MULTI OR MULTIPLE OR PLURAL?)(2A)FREQUENCY OR MULTIFREQUENCY)(4A)
         (RESONA? OR OSCILLAT? OR TRANSDUCER)
L6     9 S L5 AND COHERENT
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L7 27 S L5 AND(MHZ OR MEGA HZ OR MEGA HERTZ OR MEGAHERTZ OR RADIO OR RF)
L8 0 S L5 AND(CANCER? OR TUMOR? OR MALIGN?)
L9 2 S L5 AND (TISSUE OR ORGAN)
L10 62 S L2,L4,L6-9
L11 37 S L10 AND PY<2000
FILE 'BIOSIS' ENTERED AT 11:44:50 ON 24 AUG 2006
L12 35 S L11
FILE 'MEDLINE' ENTERED AT 11:45:16 ON 24 AUG 2006
L13 29 S L11
FILE 'CA, BIOSIS, MEDLINE' ENTERED AT 11:46:09 ON 24 AUG 2006
L14 102 DUP REM L10 L12 L13 (24 DUPLICATES REMOVED)

=> d bib;ab l14 1-102

L14 ANSWER 26 OF 102 BIOSIS on STN
AN 1999:180544 BIOSIS
TI Quantitative assessment of protein content in irradiated human skin.
AU Lahtinen, Tapani [Reprint author]; Nuutinen, Jouni; Alanen, Esko; Turunen, Marita; Nuortio, Lauri; Usenius, Taina; Hopewell, John W.
CS Department of Oncology, Kuopio University Hospital, FIN - 70210, Kuopio, Finland
SO International Journal of Radiation Oncology Biology Physics, (**Feb. 1, 1999**) Vol. 43, No. 3, pp. 635-638. print.
AB Purpose: Radiation-induced fibrosis is a common late reaction of radiation therapy. Due to a lack of feasible noninvasive techniques to assess this reaction, the long-term development of radiation fibrosis is not well described. In order to develop quantitative means for the purpose, subcutaneous fibrosis of breast cancer patients after postmastectomy radiotherapy was evaluated by clinical scoring and a new technique based on **dielectric** properties of the skin. Methods and Materials: **Dielectric** properties of biological tissues at radiofrequencies are principally determined by tissue water content. The major skin components are proteins, proteoglycans, and water either free or bound to the surface of proteins and proteoglycans. Since the MR studies have shown that bound water is tightly attached onto the surface of collagen, a **dielectric** measurement sensitive to bound water could be related to the protein content. Therefore, the **dielectric** constant of human skin was measured in **vivo** with an open-ended coaxial probe at electromagnetic (EM) **frequencies** in the range of delta-dispersion. Since the in vitro experiments with protein-water solutions have indicated that the slope of the **dielectric** constant vs. the EM **frequency** is a measure of the protein concentration, a respective slope was determined with irradiated skin of 14 breast cancer patients 2 years after postmastectomy radiotherapy at 63, 100, 300, and 500 MHz. Irradiated skin sites were clinically scored for subcutaneous fibrosis using a scale: none, slight, moderate, or severe fibrosis. Results: A statistically significant correlation was found between the slope and the clinical score of subcutaneous fibrosis at 63, 100, and 300 MHz but not at 500 MHz. The correlation was best at 100 and 300 MHz. Conclusions: Considerable changes in the **dielectric** constant of the irradiated skin were found. The correlation between the **dielectric** constant and clinical score suggests that this novel technique is a potential tool for the follow-up and quantitative assessment of

radiation-induced subcutaneous fibrosis.

L14 ANSWER 28 OF 102 BIOSIS on STN
AN 1999:369013 BIOSIS
TI Penetration of electromagnetic fields of an open-ended coaxial probe between 1 MHz and 1 GHz in **dielectric** skin measurements.
AU Alanen, Esko [Reprint author]; Lahtinen, Tapani [Reprint author]; Nuutinen, Jouni [Reprint author]
CS Department of Oncology, Kuopio University Hospital, FIN-70210, Kuopio, Finland
SO Physics in Medicine and Biology, (**June, 1999**) Vol. 44, No. 7, pp. N169-N176.
AB An open-ended coaxial probe is often used for investigating the **dielectric** properties of biological tissues. The present study indicates that in addition to the probe size, the penetration of the electromagnetic (EM) fields of an open-ended coaxial probe in contact with the skin is dependent on the applied **frequency** between 1 MHz and 1 GHz. At high **frequencies**, above 100 MHz, the measured **dielectric** parameters are functions of the **dielectric** properties of different cutaneous layers and subcutaneous fat. At lower **frequencies**, less than 10 MHz, the measurement is mainly dependent on the **dielectric** properties of superficial structures of the skin. The reason for this is that the probe, the surface of the skin, mainly stratum corneum, and underlying skin form a capacitance where the stratum corneum with low water content lies between the well-conducting dermis and the probe. The situation is equivalent to the **frequency**-dependent Maxwell-Wagner interfacial polarization. This result is verified by experimental **dielectric** measurements and with human skin in **vivo**.

L14 ANSWER 36 OF 102 CA COPYRIGHT 2006 ACS on STN
AN 129:299791 CA
TI Microwave **dielectric** analysis of human stratum corneum in **vivo**
AU Naito, Satoru; Hoshi, Masato; Yagihara, Shin
CS Biological Science Laboratories, Kao Corporation, Ichikai, Haga, Tochigi, 321-34, Japan
SO Biochimica et Biophysica Acta, General Subjects (1998), 1381(3), 293-304
AB The **dielec**. properties of the human skin stratum corneum (SC) in the **frequency** range higher than 107 Hz are not well understood because of the difficulty in selective scanning of the SC area in **vivo**. The present study was carried out to make clear factors responsible for the **dielec**. properties using a measuring system specially developed for the study of SC. We found that the **dielec**. properties of SC can be expressed by the linear combination of two relaxation processes and d.c. conduction. The faster relaxation is that of free water. The slower relaxation and d.c. conduction were analyzed using a model assuming interfacial polarization between dissimilar materials. We concluded that the polarization is the origin of the slower relaxation process because the exptl. data could be well interpreted according to the above mechanism. We also concluded that the polarization of swelled SC locates at the interface between SC cells and the intercellular lipid layer, or at the interface between the lipophilic and the hydrophilic part of the lamellar structured intercellular lipid layer.

L14 ANSWER 40 OF 102 CA COPYRIGHT 2006 ACS on STN
AN 128:189966 CA
TI **Vivo** longitudinally detected ESR measurements at microwave regions of 300, 700, and 900 MHz in rats treated with a nitroxide radical
AU Yokoyama, Hidekatsu; Sato, Toshiyuki; Ogata, Tateaki; Ohya-Nishiguchi, Hiroaki; Kamada, Hitoshi
CS Institute for Life Support Technology, Yamagata Technopolis Foundation, Yamagata, 990, Japan
SO Journal of Magnetic Resonance (1997), 129(2), 201-206
AB A signal detector of longitudinally detected ESR (LODESR) is independent of the resonant **frequency**. We developed an in **vivo** LODESR spectrometer operating in the regions of 300, 700, and 900 MHz. Using this app., we estd. signal intensities at different operating **frequencies** obtained from non- or high-**dielec**. loss phantoms that contained nitroxide radical solns. and from live rats that had received a nitroxide radical. Our result, higher signal intensities in the high-**dielec**. loss samples (such as physiol. saline soln. and animals) at a lower **frequency**, shows that the influence of a decrease in **dielec**. loss dominates over the signal redn. caused by smaller Zeeman splitting. We believe that this finding strongly supports an in **vivo** ESR resonant **frequency** that tends to be low.

L14 ANSWER 49 OF 102 BIOSIS on STN
AN 1996:340097 BIOSIS
TI In **vivo** and in **vivo dielectric** properties of tissues from 50 rabbits at radio **frequencies**.
AU Lu Yong-Jun, Hu Shan-Ming; Yu-Sheng, Bao; Biao, Lu; Bao-Wei, Hu; Jue, Yu
CS Dep. BME, Inst. Basic Med. Sci., Beijing 100005, China
SO Acta Zoologica Sinica, (**1995**) Vol. 41, No. 4, pp. 387-392.
LA Chinese
AB In this study, **dielectric** properties of tissues from 50 healthy rabbits, including muscle, liver, spleen and kidney were measured and analyzed in **vivo** and in vitro at **frequencies** from 60 to 3000MHz. An open ended coaxial line sensor was employed in the measuring system composed mainly of a Network Analyzer (HP8753C) and a computer. The **dielectric** properties, permittivity and conductivity, were calculated from the measured reflection coefficient of the sensor. Statistical analysis of the experimental data of the tissues from 50 rabbits revealed that there were definite differences (5%-30.4%) among the **dielectric** data of these rabbit tissues partly due to their different water contents. The differences between the permittivities of these tissues, when measured in **vivo** and in vitro, were found to be within the experimental uncertainty. However, there were significant changes in the conductivity of excised tissues compared with that of in **vivo** tissues, which were statistically **frequency** dependent. This work suggests that one must be careful in using the in vitro **dielectric** properties of human tissues in the majority of engineering, diagnostic as well as therapeutic applications at Radio **frequencies**.

L14 ANSWER 58 OF 102 BIOSIS on STN
AN 1992:255503 BIOSIS
TI **DIELECTRIC** PROPERTIES OF YEAST CELLS AS DETERMINED BY ELECTROROTATION.
AU HOELZEL R [Reprint author]; LAMPRECHT I

CS INST BIOPHYSIK, FREIEN UNIV BERLIN, THIELALLEE 63, D-1000 BERLIN 33, GER
SO Biochimica et Biophysica Acta, (**1992**) Vol. 1104, No. 1, pp. 195-200.
AB Electrorotational spectra of yeast cells, Saccharomyces cerevisiae strain R XII, were measured over a **frequency** range of nearly 7 decades. The physical properties of distinct cell parts were simultaneously determined for individual cells by comparison with an electrical two-shell model: The conductivity of the cytoplasm, cell wall and cytoplasmic membrane of living cells were found to be 5.5 mS/cm, 0.1 to more than 0.5 mS/cm and less than 0.25 nS/cm to 4.5 μS/cm, respectively. The conductivity of the cytoplasmic membrane was dependent on the conductivity of the medium. Membrane behavior is interpreted as an opening of membrane channels when the environment becomes more physiological. The specific membrane capacitance was determined to be 1.1 μF/cm2 and the thickness of the cell wall was calculated as 0.11 μm. Heat treated cells showed an increased membrane conductivity of more than 0.1 μS/cm (at 25 μS/cm medium conductivity) and a drop in cytoplasmic conductivity to between 0.1 and 0.8 mS/cm, depending on the length of time the cells were suspended in low conductivity water (25 μS/cm), indicating a perforation of the membrane. A slightly decreased spinning speed scaling factor for dead cells suggests a modification to the cellular surface, while the principal structure of the cell wall appears to be uneffected. It can be demonstrated by these observations, that cellular electrorotation permits the simultaneous investigation of the different cellular compartments of individual cells in **vivo** under various environmental conditions.

L14 ANSWER 59 OF 102 BIOSIS on STN
AN 1992:148475 BIOSIS
DN PREV199293082700; BA93:82700
TI **DIELECTRIC** PROPERTIES OF FEMALE HUMAN BREAST TISSUE MEASURED IN-VITRO AT 3.2 GHZ.
AU CAMPBELL A M [Reprint author]; LAND D V
CS DEP PHYSICS ASTRONOMY, UNIVERSITY GLASGOW, GLASGOW G12 8QQ, UK
SO Physics in Medicine and Biology, (**1992**) Vol. 37, No. 1, pp. 193-210.
AB Complex permittivities of in vitro diseased and undiseased human female breast tissues have been measured at 3.2 GHz using a resonant cavity technique. Ranges of **dielectric** properties and water contents of these tissues are presented. Experimental data are compared with models predicted from mixture equations. Measured primittivity data lie within limits set by two-phase mixture theory, but some conductivity data are in excess of those expected for a mixture of saline and protein. At any particular microwave **frequency** of all tissue of a given type, the relationship between permittivity and conductivity may be parametrized using the Debye relaxation equations. For each breast tissue type a characteristic relaxation **frequency** was calculated and found to be lower than that of physiological saline at the same temperature. It is concluded that the **dielectric** relaxation of tissue water is not the only dispersive process occurring at this **frequency**: **dielectric** relaxation of bound water and the tail end of a β-dispersion may also contribute to the **dielectric** properties. The similarity of the **dielectric** properties of benign and malignant breast tumours measured in this work suggest that in **vivo dielectric** imaging methods will not be capable of

distinguishing them.

L14 ANSWER 64 OF 102 BIOSIS on STN
AN 1991:182718 BIOSIS
TI **DIELECTRIC** PROPERTIES OF MOUSE MCA1 FIBROSARCOMA AT DIFFERENT STAGES OF DEVELOPMENT.
AU SWARUP A [Reprint author]; STUCHLY S S; SUROWIEC A
CS DEP ELECTRICAL ENGINEERING, UNIVERSITY OTTAWA, OTTAWA, ONTARIO K1N 6N5, CAN
SO Bioelectromagnetics, (**1991**) Vol. 12, No. 1, pp. 1-8.
AB The in **vivo** bulk electrical properties of MCA1 fibrosarcoma induced in C57Bl/6 male mice were measured at **frequencies** of 10 kHz to 100 MHz, with some tissues measured to 2 GHz. The properties of normal surrounding tissue also were measured. A comparison of the **dielectric** properties between three different stages of tumor development as well as that between various locations within the tumor is reported. Statistical analysis of the experimental results revealed statistically significant differences in the **dielectric** constant and conductivity of the tumor tissues at various stages of development as measured at **frequencies** below 10 MHz. Conductivity values at different stages also differ at a **frequency** of 100 MHz. At other **frequencies** these differences were found to be statistically insignificant.

L14 ANSWER 74 OF 102 BIOSIS on STN
AN 1987:468023 BIOSIS
DN PREV198784113463; BA84:113463
TI IN-**VIVO DIELECTRIC** MEASUREMENT OF BIOLOGICAL TISSUES IN THE **FREQUENCY** RANGE 0.4. TO 1.3 GHZ.
AU RAY S [Reprint author]; BEHARI J
CS SCH ENVIRONMENTAL SCI, JAWAHARLAL NEHRU UNIV, NEW DELHI-110067, INDIA
SO Journal of Bioelectricity, (**1987**) Vol. 6, No. 1, pp. 71-92.
AB The **dielectric** properties of rat organs were studied in **vivo** in the **frequency** range 0.4-1.3 GHz, using a monopole technique. Monopoles suitable for the **frequency** range were designed, and **dielectric** permittivities of different organs were computed from the measured terminal impedances of the monopoles in the presence of the tissue of interest. Dispersion due to bound water attached to the protein molecules of particular organs was observed. The relaxation **frequency** and degree of dispersion for each organ was calculated, and the amount of bound water was estimated from these observations. The solid content of the tissue and the protein content in each organ were also evaluated. It was found that different sections of brain have different **dielectric** properties and different relaxation **frequencies**.

L14 ANSWER 75 OF 102 BIOSIS on STN
AN 1987:8647 BIOSIS
TI **DIELECTRIC** PROPERTIES OF COBALT GAMMA-IRRADIATED AND MICROWAVE-HEATED RAT TUMOR AND SKIN MEASURED IN-**VIVO** BETWEEN 0.2 AND 2.4 GIGAHERTZ.
AU ZYWIETZ F [Reprint author]; KNOECHEL R
CS INST BIOPHYSICS RADIOBIOL, UNIV HAMBURG, MARTINISTRASSE 52, D-2000 HAMBURG 20, FRG
SO Physics in Medicine and Biology, (**1986**) Vol. 31, No. 9, pp. 1021-1030.
AB The **dielectric** properties of a rat tumour (rhabdomyosarcoma R1H), skin

and muscle were measured in **vivo** with an open-ended coaxial line and a computer-controlled system based on a network analyser. The permittivity of the tumour R1H and of the normal tissues in anaesthetised rats was determined at **frequencies** between 0.2 and 2.4 GHz. No significant differences were observed either between rat tumour and muscle or between normal and 15 Gy irradiated rat tumour and skin. However, after a hyperthermia treatment 43° C for 60 min the **dielectric** properties, especially of the rat skin, changed due to the hyperthermic induced oedema which is related to an increase in tissue water content. The process of the oedema modifies the **dielectric** properties of the skin to a higher degree than those of the tumour.

L14 ANSWER 76 OF 102 BIOSIS on STN
AN 1986:440824 BIOSIS
TI IN-**VIVO** AND IN-VITRO **DIELECTRIC** PROPERTIES OF FELINE TISSUES AT LOW RADIOFREQUENCIES.
AU SUROWIEC A [Reprint author]; STUCHLY S S; KEANEY M; SWARUP A
CS DEP ELECTRICAL ENG, UNIV OTTAWA, OTTAWA, ONTARIO K1N 6N5, CANADA
SO Physics in Medicine and Biology, (**1986**) Vol. 31, No. 8, pp. 901-910.
AB The **dielectric** constant and conductivity of muscle, liver, spleen and kidney of cats in **vivo** and in situ immediately following the animal's death were measured at **frequencies** from 10 kHz to 100 MHz. A novel multi-ring capacitive sensor and a computer-controlled automatic network analyzer (ANA) were employed. The results were compared with the data available from literature for the same species in the **frequency** range between 10 and 100 MHz. It was found that at **frequencies** from 10 to 100 kHz the in vitro **dielectric** constant for all tissues except spleen was smaller than the in **vivo** one. In constrast, in the range from 1 to 100 MHz the in vitro **dielectric** constant was larger than the in **vivo** one. At intermediate **frequencies** from 0.1 to 1 MHz both the **dielectric** constant in **vivo** and in vitro were the same within the experimental uncertainty. The **dielectric** constant of the spleen in **vivo** was quite similar to that in vitro. The in **vivo** conductivity of all tissues appeared to be higher than in vitro from 10 kHz to 10 MHz, while at **frequencies** above 10 MHz the two conductivities were within the experimental uncertainty.

L14 ANSWER 82 OF 102 BIOSIS on STN
AN 1985:328088 BIOSIS
TI **DIELECTRIC** PROPERTIES OF FROG RANA-CATESBEIANA TISSUES IN-**VIVO** AND IN-VITRO.
AU SCHWARTZ J-L [Reprint author]; MEALING G A R
CS DIV BIOL SCI, NATIONAL RES COUNCIL, OTTAWA, ONTARIO, CANADA K1A 0R6
SO Physics in Medicine and Biology, (**1985**) Vol. 30, No. 2, pp. 117-124.
AB The relative permittivity and conductivity of blood, physiological saline, adominal skin, skeletal muscle and heart of the bullfrog R. catesbeiana were measured at **frequencies** between 200 MHz and 8 GHz both in **vivo** and in vitro using an open-ended coaxial line probe in conjunction with an automatic network analyzer. When compared to published data on the **dielectric** properties of various tissues of the same and other species, the relative permittivity of frog skeletal muscle was similar to that of other species, except for the barnacle;

the **dielectric** properties of frog heart were within the same range as for other species [cat, rat and dog]; differences exist between values obtained for heart in **vivo** and in vitro and the **dielectric** properties of frog skin and blood compare well with those of human skin and blood.

L14 ANSWER 86 OF 102 BIOSIS on STN
AN 1983:187720 BIOSIS
TI DI ELECTRIC PROPERTIES OF ANIMAL TISSUES IN-**VIVO** AT RADIO AND MICROWAVE **FREQUENCIES** COMPARISON BETWEEN SPECIES.
AU STUCHLY M A [Reprint author]; KRASZEWSKI A; STUCHLY S S; SMITH A M
CS NONIONIZING RADIATION SECTION, RADIATION PROTECTION BUREAU, HEALTH AND WELFARE CANADA
SO Physics in Medicine and Biology, (**1982**) Vol. 27, No. 7, pp. 927-936.
AB An improved and modified technique with an open-ended coaxial-line sensor was used for measurement of the **dielectric** properties of animal tissues in **vivo**. The permittivity of skeletal muscle, brain cortex, spleen and liver of live cats and rats was measured at **frequencies** of 0.1-10 GHz. The differences between the properties of the same tissue for various animals are very small. The tissue properties at **frequencies** > 1 GHz correlate well with the water content. Practically all water in the skeletal muscle is in the free form, while in other tissues both free and bound water are present.

L14 ANSWER 87 OF 102 MEDLINE on STN
AN 83100547 MEDLINE
DN PubMed ID: 7181965
TI In **vivo** and in vitro **dielectric** properties of animal tissues at radio **frequencies**.
AU Kraszewski A; Stuchly M A; Stuchly S S; Smith A M
SO Bioelectromagnetics, (**1982**) Vol. 3, No. 4, pp. 421-32.

L14 ANSWER 90 OF 102 MEDLINE on STN
AN 82045935 MEDLINE
DN PubMed ID: 7295367
TI **Dielectric** properties of animal tissues in **vivo** at **frequencies** 10 MHz--1 GHz.
AU Stuchly M A; Athey T W; Stuchly S S; Samaras G M; Taylor G
SO Bioelectromagnetics, (**1981**) Vol. 2, No. 2, pp. 93-103.
AB An open-ended coaxial line sensor in conjunction with an automatic network analyzer was used to measure in **vivo** the permittivity of several feline tissues (skeletal and smooth muscle, liver, kidney, spleen, and brain--gray and white matter) at **frequencies** between 10 MHz and 1 GHz. The estimated uncertainties of measurement were between 1.5% and 5%. The data are in general agreement with previously obtained data in vitro and in **vivo**. Significant differences in the properties of different types of the same tissue (eg, skeletal and smooth muscle) were observed. Many tissues were found to be non-homogeneous in its permittivity.

L14 ANSWER 91 OF 102 BIOSIS on STN
AN 1982:180768 BIOSIS
TI SELECTIVE TUMOR HEATING BY SHORTWAVE RADIO **FREQUENCY**.
AU AUDA S P [Reprint author]; STEINERT H R; ELIAS E G; VIRAVATHANA T
CS UNIV MD HOSP, ROOM 13-1202, 22 S GREENE ST, BALTIMORE, MD 21201, USA

SO Cancer, (**1980**) Vol. 46, No. 9, pp. 1962-1968.
AB Experimental solid tumors were treated in **vivo** with external high **frequency dielectric** heating to observe any heat selectivity between the tumor mass and the subcutaneous tissue, muscle and systemic temperatures. Methylcholanthrene-induced sarcoma cells were inoculated into the subcutaneous tissue or muscles of the posterior thigh of isologous Fischer rats. When the tumor mass reached the desired size, **dielectric** heating with a fixed **frequency** of 13.56 MHz was applied locally to the tumor-bearing area. All the periods of treatment were kept constant at 1 h. Temperature was measured with thermocouple probes inserted directly into the tumor mass and the tissues lying within the electromagnetic field. Systemic temperature was monitored via a clinical Hg thermometer inserted into the rectum. Temperature recordings were taken at 5 min intervals during which time the power was turned off to avoid the RF [radiofrequency] interference and to allow thermal equilibrium between the probes and the tissue. The results showed a high selective temperature gradient for the tumor mass as compared to the subcutaneous and muscle tissue when tumor masses were greater than 1.0 cm3. No selectivity was detected in small tumors or in nontumor-bearing controls. Systemic temperature did not rise by these treatments. No tumor regression was observed at this dosage. Burns were noted in those animals in which normal tissue temperature rose above 43° C.

L14 ANSWER 93 OF 102 CA COPYRIGHT 2006 ACS on STN
AN 93:40758 CA
TI In **vivo** probe measurement technique for determining **dielectric** properties at VHF through microwave **frequencies**
AU Burdette, Everette C.; Cain, Fred L.; Seals, Joseph
CS Eng. Exp. Stn., Georgia Inst. Technol., Atlanta, GA, 30332, USA
SO IEEE Transactions on Microwave Theory and Techniques (1980), MTT-28(4), 414-27
AB A novel probe technique for the detn. of **dielec**. properties of semisolid materials and living tissues in situ is described exptl. and theor. This method, based on an antenna modeling theorem, offers unique advantages over conventional **dielec**. measurement techniques including (1) an ability to perform living (in **vivo**) tissue **dielec**. measurements, (2) elimination of the need for tedious sample prepn., (3) the ability to obtain continuous **dielec**. property data from < 0.1 GHz to > 10 Ghz, and (4) the ability to process data on a real time basis. Results of system performance evaluation via measurements of std. liq. **dielec**. and in **vivo** tissue data are presented.

L14 ANSWER 96 OF 102 CA COPYRIGHT 2006 ACS on STN
AN 88:34029 CA
TI RF **dielectric** properties measurement system: human and animal data
AU Toler, J.; Seals, J.
CS Syst. Tech. Lab., Georgia Inst. Technol., Atlanta, GA, USA
SO DHEW (NIOSH) Publication (United States) (1977), 77-176, 79 pp.
AB A system was evaluated for accurately and reproducibly measuring the elec. properties (relative **dielec**. const. and cond.) of materials used in phantom modeling research. The **frequency** range of interest was 10-100 MHz. The system is based on an antenna modeling theorem that

relates the impedance of a short monopole antenna in air to its impedance in **dielec**. media with high radiofrequency power absorption such as phantom modeling materials and biol. tissues. Implementation of the system resulted in an equipment configuration consisting of a signal source, network analyzer, and small in **vivo** probe. Accuracy and reproducibility of the system were demonstrated by comparing measured elec. property data with corresponding ref. data published in the literature. Sample materials used in this data comparison were std. liqs. (water, MeOH, ethylene glycol, and saline solns.) and phantom modeling materials. Both discrete and swept **frequency** measurements were made, and accuracies within ±5% were demonstrated.

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=> log y
STN INTERNATIONAL LOGOFF AT 11:47:01 ON 24 AUG 2006

=> d his

     (FILE 'HOME' ENTERED AT 19:05:45 ON 23 AUG 2006)
     FILE 'CA' ENTERED AT 19:05:52 ON 23 AUG 2006
L1 26323 S ANISOTROP?(6A)(ANALY? OR ASSAY? OR DETECT? OR DETERMIN? OR
         ESTIMAT? OR EVALUAT? OR EXAMIN? OR ASSESS? OR TEST? OR MEASUR? OR
         MONITOR? OR SENSE# OR SENSOR OR SENSING OR IDENTIF? OR PROBE# OR
         PROBING OR QUANTITAT? OR QUANTIF? OR ASCERTAIN? OR DISTINGUISH?)
L2   249 S ANISOTROP?(5A)(TISSUE OR ORGAN OR COLON OR BREAST OR SKIN OR
         MUSCLE OR BONE)
L3    58 S L1 AND L2
L4   433 S L1 AND(HARMONIC OR OVERTONE)
L5   224 S L1 AND ELECTROMAGNET?
L6   500 S L1 AND(MHZ OR MEGA HZ OR MEGAHERTZ OR MEGA HERTZ OR RF OR RADIO
         FREQUENCY)
L7    17 S L4 AND L5-6
L8    40 S L1 AND (CW OR CONTINUOUS WAVE)
L9   115 S L3,L7-8
     FILE 'BIOSIS' ENTERED AT 19:29:35 ON 23 AUG 2006
L10  169 S L9
     FILE 'MEDLINE' ENTERED AT 19:32:02 ON 23 AUG 2006
L11  210 S L9
L12  125 S L11 AND PY<2001
     FILE 'BIOSIS' ENTERED AT 19:33:53 ON 23 AUG 2006
L13  112 S L10 AND PY<2001
     FILE 'CA, MEDLINE, BIOSIS' ENTERED AT 19:34:38 ON 23 AUG 2006
L14  241 DUP REM L9 L12 L13 (111 DUPLICATES REMOVED)

=> d bib,ab l14 1-241

L14  ANSWER 12 OF 241  CA  COPYRIGHT 2006 ACS on STN
AN   144:288786  CA
TI   Measurements of the anisotropy of ultrasonic velocity in freshly excised
     and formalin-fixed myocardial tissue
AU   Baldwin, Steven L.; Yang, Min; Marutyan, Karen R.; Wallace, Kirk D.;
     Holland, Mark R.; Miller, James G.
CS   Department of Physics, Washington University, St. Louis, MO, 63130, USA
SO   Journal of the Acoustical Society of America (2005), 118(1), 505-513
AB   The objective of this study was to quantify the anisotropy of
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ultrasonic velocity in freshly excised myocardial tissue and to examine the effects of formalin-fixation. **Through-transmission radio-frequency-based measurements** were performed on ovine and bovine myocardial specimens from 24 different hearts. A total of 81 specimens were obtained from specific locations within each heart to investigate the possibility of regional differences in anisotropy of velocity in the left ventricular wall and septum. No regional differences were obsd. for either lamb or cow myocardial specimens. In addn., no specific species-dependent differences were obsd. between ovine and bovine myocardium. Av. values of velocity at room temp. for perpendicular and parallel insonification were 1556.9±0.6 and 1565.2±0.7 m/s (mean±std. error), resp., for bovine myocardium (N=45) and 1556.3±0.6 and 1564.7± 0.7 m/s for ovine myocardium (N=36). Immediately after measurements of freshly excised myocardium, ovine specimens were fixed in formalin for at least one month and then measurements were repeated. Formalin-fixation appears to increase the overall velocity at all angles of insonification and to increase the magnitude of anisotropy of velocity.

L14 ANSWER 55 OF 241 MEDLINE on STN
AN 1999372613 MEDLINE
TI Clinical use of diffusion-tensor imaging for diseases causing neuronal and axonal damage.
AU Ulug A M; Moore D F; Bojko A S; Zimmerman R D
CS Department of Radiology, Cornell University Medical College-New York Presbyterian Hospital, NY 10021, USA.
SO AJNR. American journal of neuroradiology, **(1999 Jun-Jul)** Vol. 20, No. 6, pp. 1044-8.
AB Diffusion-tensor imaging is an emerging technique that can supply microscopic structural information about tissue in vivo. With this technique it is possible to **measure** the amount of **anisotropy** of water diffusion within **tissues** and to assess the degree to which directionally ordered tissues have lost their normal integrity. This study was performed in four patients to evaluate the feasibility of applying this technique in clinical situations in which there is known or suspected damage to white matter tracts.

L14 ANSWER 67 OF 241 CA COPYRIGHT 2006 ACS on STN
AN 132:240022 CA
TI **Harmonic** measuring system for nondestructive determination of properties of sheet steel
AU Reimche, W.; Heutling, B.; Krys, A.; Stegemann, D.; Feiste, K.; Kroos, J.; Stolzenberg, M.; Westkamper, G.; Angerer, R.
CS Institut fur Kerntechnik und Zerstorungsfreie Prufverfahren, Universitat Hannover (D), Germany
SO Werkstoffwoche '98, Band X: Symposium 13, Werkstoffpruefung, Munich, Sept., 1998 (1999), Meeting Date 1998, 377-384. Editor(s): Muster, Walter; Ziebs, Josef; Link, Rainer. Publisher: Wiley-VCH Verlag GmbH, Weinheim, Germany.
LA German
AB The **harmonic** anal. of eddy current signals was developed for nondestructive characterization of the material properties (anisotropy, hardness, tensile strength, and yield stress) of C steel sheet for automobile bodies. A description is given of the working principle of

the above method together with the setup of a measuring system. Examples are given of the detn. of the tensile strength of some steel grades.

L14 ANSWER 70 OF 241 MEDLINE on STN
AN 1999113804 MEDLINE
TI Assessment of the directional elastic moduli of ewe vertebral cancellous bone by vibrational testing.
AU Weinhold P S; Roe S C; Gilbert J A; Abrams C F
CS Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, USA.. weinhold@med.unc.edu
SO Annals of biomedical engineering, **(1999 Jan-Feb)** Vol. 27, No. 1, pp. 103-10.
AB The ovariectomized ewe is being used as an animal model for postmenopausal osteoporosis. Data on the mechanical properties of ewe vertebral cancellous bone is needed to assess its effectiveness as a model for vertebral osteoporosis. This study utilized traditional compression testing and a novel nondestructive vibrational testing method to assess the directional mechanical properties of ewe vertebral cancellous bone. Composition and density properties were also assessed. It was hypothesized that vibrational testing would have utility in that it would allow for the **anisotropic** stiffness of cancellous **bone** to be **assessed** nondestructively. The present study has found that ewe vertebral cancellous bone has similar physical and mechanical properties to humans. The vibrational testing method described was able to nondestructively provide a valid measure of stiffness that was correlated with stiffness estimates from traditional compression testing. Furthermore, the stiffness measure from the vibration test was found to be sensitive to the architecture of cancellous bone. These results suggest the promise of this testing method for the nondestructive mechanical assessment of skeletal tissue.

L14 ANSWER 76 OF 241 MEDLINE on STN
AN 1998267722 MEDLINE
TI Acoustic **anisotropy** in bovine cancellous **bone**.
AU Hosokawa A; Otani T
CS Department of Electrical Engineering, Faculty of Engineering, Doshisha University, Kyotanabe-shi, Japan.
SO The Journal of the Acoustical Society of America, **(1998 May)** Vol. 103, No. 5 Pt 1, pp. 2718-22.
AB This paper presents the experimental results on the acoustic **anisotropy** in bovine cancellous **bone**. The propagation of both fast and slow longitudinal waves in bovine cancellous bone was experimentally **examined** in relation to the structural **anisotropy**, or the trabecular arrangement. Propagation speeds of the fast and slow waves were measured as a function of the propagation angle to the trabecular alignment, and theoretically estimated by use of Biot's theory for an isotropic medium.

L14 ANSWER 91 OF 241 CA COPYRIGHT 2006 ACS on STN
AN 127:274860 CA
TI The source of NMR-**detected** motional **anisotropy** of water in blood vessel walls
AU Sharf, Y.; Knubovets, T.; Dayan, D.; Hirshberg, A.; Akselrod, S.; Navon,

G.
CS Sch. Phys., Tel Aviv Univ., Ramat Aviv, 69978, Israel
SO Biophysical Journal (1997), 73(3), 1198-1204
AB 2H double quantum-filtered (DQF) NMR spectroscopy of deuterated water is sensitive to the presence of order in biol. systems. This is because the only nuclei that are detected are those with residual quadrupolar interactions due to their anisotropic motion. In the present study, samples of aorta, coronary and carotid arteries, and vena cava were studied in parallel by 2H DQF NMR and by light microscopy. The av. quadrupolar splitting, calcd. from the NMR data, varies considerably among the different blood vessels, with high reproducibility for each type of vessel. Polarization microscopy examns. using collagen-specific staining with picrosirius red, have shown a variety of color profiles for the different blood vessels. These reflect different phys. modes of aggregation (packing and thickness) of collagen fibers. A correlation was found between the NMR parameters and the color profiles of the picrosirius red-stained sections. Treating the blood vessels with 90% formic acid resulted in the elimination of the 2H DQF NMR signal. Histol. anal. demonstrated a complete degrdn. of collagen and muscle, whereas the elastin filaments were preserved. Evidence is given that the 2H DQF NMR signal is dominated by the contribution of water mols. interacting with the collagen fibers.

L14 ANSWER 95 OF 241 MEDLINE on STN
AN 97384320 MEDLINE
TI The in vitro measurement of ultrasound in cancellous bone.
AU Langton C M; Hodgskinson R
CS Centre for Metabolic Bone Disease, University of Hull, UK.
SO Studies in health technology and informatics, **(1997)** Vol. 40, pp. 175-99.
AB This paper describes our recent findings on the relationships between ultrasonic measurements (velocity and broadband ultrasonic attenuation) and some physical properties of human and bovine cancellous bone (density, trabecular orientation and Young's modulus of elasticity). We have found velocity to be an extremely effective measure of Young's modulus (R2 approximately 95%). When velocity is combined with a measure of apparent density R2 improves to approximately 97%. We demonstrate that this is due to the ability of ultrasound velocity to **measure** structural **anisotropy** in the **tissue**. The findings for broadband ultrasonic attenuation (BUA) are more complex. In the same specimens BUA is not as good as velocity at predicting Young's modulus (R2 approximately 62%). We demonstrate that this is due to a non-linear relationship between BUA and tissue density (porosity). However there is a strong indication that BUA is also affected by variation in cancellous structure.

L14 ANSWER 99 OF 241 MEDLINE on STN
AN 96250705 MEDLINE
TI Anisotropy of the slope of ultrasonic attenuation in formalin fixed human myocardium.
AU Verdonk E D; Hoffmeister B K; Wickline S A; Miller J G
CS Washington University, Department of Physics, St. Louis, Missouri 63130, USA.
SO The Journal of the Acoustical Society of America, **(1996 Jun)** Vol. 99,

No. 6, pp. 3837-43.

AB Clinical implementation of quantitative ultrasonic tissue characterization is likely to require imaging the heart with sound propagating at varying angles relative to the fibers of the heart. Under these circumstances, the variation of the ultrasonic properties of myocardium with the angle of propagation relative to the myofibers may represent a significant source of potential misinterpretation. In the present study, the systematic approach of **assessing** the impact of **anisotropy** on **quantitative** myocardial **tissue** characterization is extended by reporting results of a recent in vitro study to **measure** the **anisotropy** of the slope of ultrasonic attenuation in specimens of formalin fixed human myocardium. Data obtained from regions of remote infarct are presented and compared to data acquired from regions identified to be free of infarct. The slope of attenuation for both regions exhibit a sinusoid-like dependence on angle that is approximately doubled for propagation parallel to the fibers as compared to perpendicular. These results are, in turn, compared to an earlier study from the laboratory that examined the effects of myocardial infarction on ultrasonic attenuation and interstitial collagen content in freshly excised canine hearts. Discussion regarding the analysis and interpretation of measurements of slope of attenuation is presented as well as a discussion of the possible influence of formalin fixation on our results.

L14 ANSWER 104 OF 241 MEDLINE on STN

AN 97093672 MEDLINE

TI Diffusion tensor MR imaging of the human brain.

AU Pierpaoli C; Jezzard P; Basser P J; Barnett A; Di Chiro G

CS Neuroimaging Branch, National Institute of Neurological Diseases and Stroke, National Institutes of Health, Bethesda, MD 20892-1178, USA.

SO Radiology, **(1996 Dec)** Vol. 201, No. 3, pp. 637-48.

AB PURPOSE: To assess intrinsic properties of water diffusion in normal human brain by using quantitative parameters derived from the diffusion tensor, D, which are insensitive to patient orientation. MATERIALS AND METHODS: Maps of the principal diffusivities of D, of Trace(D), and of diffusion anisotropy indices were calculated in eight healthy adults from 31 multisection, interleaved echo-planar diffusion-weighted images acquired in about 25 minutes. RESULTS: No statistically significant differences in Trace(D) (approximately 2,100 x 10(-6) mm2/sec) were found within normal brain parenchyma, except in the cortex, where Trace (D) was higher. Diffusion anisotropy varied widely among different white matter regions, reflecting differences in fiber-tract architecture. In the corpus callosum and pyramidal tracts, the ratio of parallel to perpendicular diffusivities was approximately threefold higher than previously reported, and diffusion appeared cylindrically symmetric. However, in other white matter regions, particularly in the centrum semiovale, diffusion anisotropy was low, and cylindrical symmetry was not observed. Maps of parameters derived from D were also used to segment tissues based on their diffusion properties. CONCLUSION: A **quantitative** characterization of water diffusion in **anisotropic**, heterogeneously oriented **tissues** is clinically feasible. This should improve the neuroradiologic assessment of a variety of gray and white matter disorders.

L14 ANSWER 115 OF 241 MEDLINE on STN
AN 95153825 MEDLINE
TI Sensitive detection of abnormal aortic architecture in Marfan syndrome with high-frequency ultrasonic tissue characterization.
AU Recchia D; Sharkey A M; Bosner M S; Kouchoukos N T; Wickline S A
CS Washington University School of Medicine, St Louis, MO 63178.
SO Circulation, **(1995 Feb 15)** Vol. 91, No. 4, pp. 1036-43.
AB BACKGROUND: Aneurysmal dilation of the aorta with subsequent rupture or dissection occurs frequently in patients with Marfan syndrome and is the primary cause of morbidity. These complications are related to the altered composition and disorganized structure of the aortic media. Our goal was to use high-frequency ultrasonic tissue characterization to identify these structural changes in abnormal aorta from patients with Marfan syndrome. We **measured** integrated backscatter and **anisotropy** of backscatter of ultrasound from specimens of aorta from patients with Marfan syndrome undergoing aortic root replacement and compared these values with those from aortic specimens of patients without clinical aortic pathology. METHODS AND RESULTS: Aortic tissue was obtained at the time of surgery from 11 patients with Marfan syndrome undergoing repair of an aortic aneurysm or dissection. Normal tissue was obtained at the time of autopsy from 8 patients without evidence of aortic disease. Acoustic microscopy at 50 MHz was performed to measure integrated backscatter from each specimen. The magnitude of ultrasonic **anisotropy** of backscatter for each **tissue** type was determined as an index of the three-dimensional (3D) organization of the vessel matrix. The collagen content of each specimen was determined with a hydroxyproline assay. Marfan aortas exhibited less backscatter than did normal aortas (-40.9 +/- 2.9 versus -32.6 +/- 2.2 dB for patients with Marfan syndrome and healthy subjects, respectively, $P < .0001$). No significant difference in collagen concentrations was observed between normal and Marfan aorta (262.7 +/- 52.7 versus 282.4 +/- 41.8 mg/g tissue for normal and Marfan aortas, respectively, $P = .42$), despite the large difference in backscatter. Histological analysis revealed striking differences in both the amount and organization of the elastin in the aortic aneurysm segments from patients with Marfan syndrome compared with normal aorta. Normal aorta was characterized by well-formed elastin fibers arranged in a lamellar pattern. The media from aneurysms in Marfan aorta exhibited a profound decrease in elastin content that was associated with loss of the highly aligned and ordered lamellar arrangement. The directional dependence of scattering, or ultrasonic anisotropy, also differed dramatically between the two tissue types. Backscatter from normal aorta decreased substantially when the media was insonified parallel compared with perpendicular to the principal axis of the elastin fibers. Marfan aorta exhibited a much smaller directional dependence of scattering. Normal aortas manifested a 14-fold greater ultrasonic anisotropy than did Marfan aortas (24.1 +/- 3.7 versus 12.4 +/- 3.3 dB for normal and Marfan aortas, $P < .0001$), which is indicative of the profound extent of matrix disorganization in Marfan syndrome. CONCLUSIONS: These data show that high-frequency ultrasonic tissue characterization sensitively detects changes in vessel wall composition and organization that occur in the aorta of patients with Marfan syndrome. Aortic segments from these patients manifested a significant decrease in integrated backscatter compared with normal

aorta (approximately 8 dB, or greater than a 6-fold decrease in scattering). A 15-fold reduction in the ultrasonic **anisotropy** of Marfan **tissue** was observed, which suggests a marked disorganization of the 3D architecture of these aortas. These data support the hypothesis that high-frequency ultrasonic tissue characterization may be useful for identifying abnormalities of vessel wall composition, architecture, and material properties.

L14 ANSWER 117 OF 241 MEDLINE on STN
AN 95294037 MEDLINE
TI Identification of elastic properties of homogeneous, orthotropic vascular segments in distension.
AU Vorp D A; Rajagopal K R; Smolinski P J; Borovetz H S
CS University of Pittsburgh, Department of Surgery, PA 15261, USA.
SO Journal of biomechanics, **(1995 May)** Vol. 28, No. 5, pp. 501-12.
AB Characterization of the constitutive behavior of normal and pathological blood vessel segments could provide the clinician with a means to predict the onset and assess the severity of certain vascular maladies. Many of the constitutive models that have been proposed to date either fail to properly consider certain features of the anatomic structure and function of vascular tissue or are so mathematically complex that their utilization is intractable. We have developed a material identification technique that first required the adaptation and validation of a constitutive law describing the nonlinear, three-dimensional behavior of orthotropic, compressible, hyperelastic vascular segments. By coupling a nonlinear finite element program and experimental data with a robust nonlinear least-squares regression algorithm, a set of elastic parameters (moduli) is obtained. Regressions on data for a canine carotid artery and rabbit infrarenal aorta yielded coefficients of variation of 0.21 and 0.08, respectively. The estimated moduli demonstrated certain trends found by other investigators: both the canine carotid artery and rabbit aorta were found to be stiffer radially than circumferentially, and the former was found to be stiffer circumferentially than longitudinally. Using these material constants and measured arterial pressures, the stress distribution was computed for each specimen. The predicted radial stress was consistent with a transmural variation of approximately--p (applied luminal pressure) to approximately zero in both specimens, while the circumferential stresses ranged from 2.2p to 0.7p for the canine carotid, and from 6.4p to 3.7p for the rabbit aorta. The stress distributions qualitatively agreed with those reported in previous investigations, as well as with certain physiologic observations. Based on the results of our two sample cases, we believe that our technique could be beneficial to the **assessment** of the three-dimensional, **anisotropic** behavior of vascular **tissue**.

L14 ANSWER 120 OF 241 CA COPYRIGHT 2006 ACS on STN
AN 125:52768 CA
TI Molecular diffusion, tissue microdynamics and microstructure
AU Le Bihan, Denis
CS Commissariat a l'Energie Atomique, Service Hospitalier Frederic Joliot, Orsay, 91401, Fr.
SO NMR in Biomedicine (1995), 8(7/8), 375-386
AB Diffusion NMR is the only method available today that noninvasively provides information on mol. displacements over distances comparable to

cell dimensions. This information can be used to infer tissue microstructure and microdynamics. However, data may be fairly difficult to interpret in biol. tissues which differ markedly from the theor. infinite isotrope medium, as many factors may affect the NMR signal. The object of this paper is to analyze the expected effects of temp., restriction, hindrance, membrane permeability, **anisotropy**, and **tissue** inhomogeneity on the diffusion **measurements**. Powerful methods, such as q-space imaging, diffusion tensor imaging and diffusion spectroscopy of metabolites further enhance the specificity of the information obtained from diffusion NMR expts.

L14 ANSWER 127 OF 241 MEDLINE on STN
AN 95107080 MEDLINE
TI **Anisotropy** of NMR properties of **tissues**.
AU Henkelman R M; Stanisz G J; Kim J K; Bronskill M J
CS Department of Medical Biophysics, University of Toronto, Ontario, Canada.
SO Magnetic resonance in medicine : official journal of the Society of Magnetic Resonance in Medicine / Society of Magnetic Resonance in Medicine, **(1994 Nov)** Vol. 32, No. 5, pp. 592-601.
AB Orientational anisotropy of T2 and T1 relaxation times, diffusion, and magnetization transfer has been investigated for six different tissues: tendon, cartilage, kidney, muscle, white matter, and optic nerve. Relaxation anisotropy was observed for tendon and cartilage, and diffusional **anisotropy** was **measured** in kidney, **muscle**, white matter, and optic nerve. All other NMR measurements of these tissues showed no orientational dependence. This pattern of NMR anisotropies can be interpreted from the underlying geometrical structures of the tissues.

L14 ANSWER 129 OF 241 MEDLINE on STN
AN 94359842 MEDLINE
TI Stereological assessment of architectural changes in dysplastic epithelium of colorectal adenomas.
AU Meijer G A; Fleege J C; Baak J P
CS Department of Pathology, Free University Hospital, Amsterdam, The Netherlands.
SO Pathology, research and practice, **(1994 Apr)** Vol. 190, No. 4, pp. 333-41.
AB BACKGROUND: Against the background of developing quantitative prognostic indicators for the future risk of colorectal cancer in adenoma bearing-patients, the possibilities of stereological measuring techniques for providing objective measures of architectural changes in colorectal adenomas were examined. MATERIAL AND METHODS: The haematoxylin-eosin stained tissue sections of 59 adenomas, of which 20 showed mild dysplasia, 20 moderate dysplasis, and 19 severe dysplasia, were assessed. Using a projection microscope equipped with a coherent test system that was specifically designed to **analyze anisotropic tissue**, the volume density of stroma, epithelium and lumen, the outer and the inner gland surface density, and the length density lumen were determined. RESULTS: With respect to grading, significant differences in the means of the inner gland surface density and the length density lumen were found mainly between mild and severe dysplasia as well as between moderate and severe dysplasia. This was especially evident when

considering the subgroup of tubular adenomas. Stepwise discriminant analysis resulted in an overall correct jackknifed classification of 81.3% when mild and moderate dysplasia cases were taken as one group, and were compared with the group of severe dysplasia cases. With respect to histological type, the volume density lumen and the outer surface density glands, were most favourable. These two features allowed for an 87.5% overall correct jackknifed classification of tubular adenomas, versus adenomas with villous components. The analysis time was roughly 30 minutes per polyp. Intra-observer reproducibility was satisfying, with CE-values < or = 5% for all variables. Inter-observer reproducibility tests were encouraging. CONCLUSIONS: The application of stereological techniques can be worthwhile in assisting in the classification of colorectal adenomatous polyps. Such techniques could therefore be a useful tool to estimate the prognostic value of adenoma morphology with respect to the development of metachronous colorectal tumours.

L14 ANSWER 135 OF 241 BIOSIS on STN
AN 1994:226634 BIOSIS
TI Space-time distribution of normal and pathological human skin dielectric properties in the millimeter wave range.
AU Ivanchenko, Igor A.; Andreyev, Eugeny A.; Lizogub, Victor G.; Sveshnikova, Ludmila V.
CS Sci. Research Center "Vidhuk", Volodymyrska St. 61-B, Kiev 252033, Ukraine
SO Electro- and Magnetobiology, (**1994**) Vol. 13, No. 1, pp. 15-25.
AB The proposed procedure was developed for studying local dielectric properties of human skin. Measuring the differential reflectivity in the millimeter wave (MMW) range along the acupuncture pericardium channel of healthy and sick groups revealed regions of **anisotropy** on the **skin** surface of persons investigated. **Anisotropy** factor calculation allowed us to **determine** the criterion for difference between healthy and sick people.

L14 ANSWER 140 OF 241 MEDLINE on STN
AN 94225703 MEDLINE
TI On **monitoring** structural changes of **anisotropic tissues** by means of statistical **analysis** of ultrasonic images.
AU Pecorari C
CS Department of Engineering Science & Mechanics, Pennsylvania State University, University Park 16802.
SO Ultrasonic imaging, **(1993 Oct)** Vol. 15, No. 4, pp. 324-34.
AB An investigation into statistical properties of ultrasonic image texture from three-dimensional clusters of anisotropic scatterers is carried out. The structural properties of the clusters are modeled after those of soft biological tissues, such as skeletal muscle tissues, both in their healthy condition and at the early stage of degenerative diseases. The average axial autocorrelation function of the intensity of the image texture is used to characterize and monitor changes of the geometrical properties of the tissue components. A distinct local increase of the autocorrelation is observed within a range of small time shifts, and it is explained in terms of the structure of the time-domain backscattered signal from each individual scatterer. It is shown that such an

increase is sensitive to structural variations of the cluster similar to those occurring at the early stage of several muscular diseases.

L14 ANSWER 145 OF 241 MEDLINE on STN
AN 92097241 MEDLINE
TI Structural remodeling of human myocardial tissue after infarction. Quantification with ultrasonic backscatter.
AU Wickline S A; Verdonk E D; Wong A K; Shepard R K; Miller J G
CS Cardiovascular Division, Washington University School of Medicine, St. Louis, MO 63110.
SO Circulation, **(1992 Jan)** Vol. 85, No. 1, pp. 259-68.
AB BACKGROUND. Remodeling of myocardial tissue after infarction may culminate in the development of either a well-healed scar or a thin, expanded heart wall segment that predisposes to ventricular aneurysm formation, congestive heart failure, or ventricular tachycardia. The three-dimensional architecture of mature human infarct tissue and the mechanisms that determine it have not been elucidated. We have previously shown that quantitative ultrasonic backscatter can be used to define the transmural organization of human myofibers in the normal ventricular wall by measuring the dependence of backscatter on the angle of insonification, or ultrasonic anisotropy. We propose that **measurement** of ultrasonic **anisotropy** of backscatter may permit **quantitative** characterization of the transmural architecture of tissue from areas of myocardial infarction and facilitate identification of fundamental mechanisms of remodeling of the ventricular wall. METHODS AND RESULTS. We measured integrated backscatter in 33 transmural sections from 12 cylindrical biopsy specimens (1.4-cm diameter) sampled from central regions of mature infarction in six explanted fixed human hearts. Tissue samples were insonified in two-degree steps around their entire circumference at successive transmural levels with a 5-MHz broad-band piezoelectric transducer. **Backscatter radio frequency data** were gated from the center of each specimen, and spectral analysis was performed on the gated radio frequency for the computation of integrated backscatter. Histological morphometric analysis was performed on each specimen for determination of the predominant fiber orientation and the percentage of tissue infarcted at consecutive transmural levels. The average percentage of tissue infarcted for all transmural levels was 49 +/- 3% (range, 13-80%). Histological attributes varied from patchy fibrosis to extensive confluent zones of scar tissue. The angle-averaged integrated backscatter for all transmural levels in infarct tissue was approximately 5 dB greater than that previously measured in normal tissue in our laboratory (-48.3 +/- 0.5 versus -53.4 +/- 0.4 dB, infarct versus normal). Marked **anisotropy** of backscatter was observed in **tissue** from areas of infarction and was characterized by a sinusoid-like dependence on the angle of insonification at each transmural level. Insonification perpendicular to infarct fibers yielded values for integrated backscatter 14.8 +/- 0.5 dB greater than those for insonification parallel to these fibers. Juxtaposition of the sinusoid-like anisotropy functions from all consecutive transmural levels demonstrated a progressive shift in the orientation of scar tissue elements from epicardial to endocardial levels of 14.6 +/- 1.5 degrees/mm of tissue. The transmural shift in fiber orientation per millimeter of tissue from the area of infarction exceeded that previously measured for normal tissue (9.2 +/- 0.7 degrees/mm) by 59%.

This marked augmentation in angular shift per millimeter of tissue results from a generalized structural rearrangement (or reorientation) of fibers across the entire ventricular wall in the infarct zone that we hypothesize is determined in part by dynamic mechanical forces, imposed by the surrounding functional normal tissue, that tether the "infarcted" tissue. CONCLUSIONS. Myocardial tissue from areas of myocardial infarction manifests substantial anisotropy of ultrasonic scattering that may be useful for quantitative characterization of the alignment and overall three-dimensional anatomic organization of mature infarct scars.

L14 ANSWER 159 OF 241 CA COPYRIGHT 2006 ACS on STN
AN 116:156596 CA
TI Mechanical properties of surfaces and layers measured with a **continuous wave** acoustic microscope
AU Gremaud, G.; Kulik, A.; Sathish, S.
CS Inst. Genie At., Ec. Polytech. Fed. Lausanne, Lausanne, Switz.
SO Adv. Mater. Processes, Proc. Eur. Conf., 1st (1990), Meeting Date 1989, Volume 2, 1421-6. Editor(s): Exner, Hans Eckart; Schumacher, V. Publisher: DGM Informationsges., Oberursel, Germany.
AB The **continuous wave** reflection scanning acoustic microscope allows direct and localized measurements of the surface acoustic wave velocity and attenuation, even in dispersive media contg. metals. The applications include quant. characterization of deposited layers or surface treatments, **measurement** of **anisotropic** elastic properties of surfaces, and **quant**. characterization of damage like microcracks and porosity.

L14 ANSWER 166 OF 241 BIOSIS on STN
AN 1990:306432 BIOSIS
TI SIMULATION AND EXPERIMENTAL STUDIES OF THE FACTOR INFLUENCING THE FREQUENCY SPECTRUM OF CARDIAC EXTRACELLULAR WAVEFORMS.
AU JOLY D [Reprint author]; SAVARD P; ROBERGE F A; VERMEULEN M; SHENASA M
CS RES CENTER, SACRE-COEUR HOSP, 5400 GOUIN BLVD WEST, MONTREAL, QUEBEC H4J 1C5, CAN
SO Journal of Electrocardiology, (**1990**) Vol. 23, No. 2, pp. 109-126.
AB Spectral analysis of electrocardiographic signals has been proposed as a tool to detect features reflecting cardiac diseases, such as ventricular hypertrophy, myocardial infarction, and a predisposition to sustained ventricular tachycardia. The lack of a theoretical basis to address this question prompted the authors to undertake a simulation study using a bidomain volume conductor model of a strip of cardiac tissue, combined with Fourier analysis, and electrograms recorded form an isolated right atrial canine preparation. In the crista terminalis, the bandwidth of the normal electrogram was 840 ± 200 Hz (mean ± SD) during longitudinal propagation and 660 ± 370 Hz during transverse propagation. During premature stimulation, signal bandwidth and propagation velocity increase with the coupling interval. In the model, a linear combination of .ovrhdot.Vmax and propagation velocity values allows simulation of the various features of premature excitation. .ovrhdot.Vmax is the major determinant of the high-frequency content of the signal. An important decrease in the high-frequency content of electrograms occurs when the recording electrode is moved away from the preparation or the simulation mode; at distances larger than 1-5 mm, the bandwidth levels off onto a

value of 50-120 Hz. Partial blockade of axial current flow in the direction of propagation due to microscopic discontinuities and variable activation delays at these discontinuities may be the cause of fragmented activity in necrotic mycardium, which is associated with a reduced bandwidth. Thus, short- and long-term effects of ischemia followed infarction, such and decreased propagation velocity, decreased action potential upstake, and fragmentation, tend to decrease the electrocardiographic bandwidth.

L14 ANSWER 240 OF 241 CA COPYRIGHT 2006 ACS on STN
AN 67:37597 CA
TI Rotating field magnetometer for **measurement** of **anisotropic** magnetic materials
AU Hagedorn, Fred B.
CS Bell Telephone Labs., Murray Hill, NJ, USA
SO Review of Scientific Instruments (1967), 38(5), 591-7
AB A new technique is discussed for the **measurement** of the properties of **anisotropic** magnetic materials. The basis of the technique is the **harmonic** analysis of the signal induced in a pick-up loop when the anisotropic material is immersed in a spatially rotating magnetic field. The **harmonics** which are generated are related in a simple way to the Fourier coeffs. of the anisotropy energy. High sensitivity is achieved through use of a lock-in detector for the **harmonic** analysis. App. is described in which the magnetic field rotates at 500 cycles/sec. with an amplitude up to 50 oe. This app. can detect a magnetic moment of 10-7 **electromagnetic** units (emu) and equiv. torque of 10-6 dyne-cm. Illustrative data obtained from a thin Permalloy film (moment of 5 × 10-3 emu) are given, in which the 1st 3 Fourier coeffs. of the anisotropy energy are 817, <18, and <1.5 ergs./cc. The abs. accuracy of the 1st coeff. is ~2%, while the reproducibility of this measurement is better than 1/2%.

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